

WHAT IS CLAIMED IS:

1. A system for communicating with smart telemetry devices as Web Services, the system comprising:

a software application;

a smart telemetry device; and

a server, wherein the server accepts a request from the software application comprising one or more of discovering, configuring, and controlling the smart telemetry device via a Web Service technology, forwards the request to the smart telemetry device via a protocol native to the smart telemetry device, receives information from the smart telemetry device in response to the request via the protocol native to the smart telemetry device, and returns the information to the software application via the Web Service technology.

2. The system of claim 1, wherein the Web Service technology comprises one or more of XML, SOAP, WSDL, UDDI, HTTP, and SMTP.

3. The system of claim 1, wherein the smart telemetry device comprises one or more of a controller device and a monitor device.

4. A method used by a server to proxy the communication between a software application and a smart telemetry device, the method comprising:

accepting a request from the software application comprising discovering, configuring, and controlling the smart telemetry device via a Web Service technology;

forwarding the request to the smart telemetry device via a protocol native to the smart telemetry device;

receiving information from the smart telemetry device in response to the request via the protocol native to the smart telemetry device; and

returning the information to the software application via the Web Service technology.

5. The method of claim 4, wherein the Web Service technology comprises one or more of XML, SOAP, WSDL, UDDI, HTTP, and SMTP.

6. The system of claim 4, wherein the smart telemetry device comprises one or more of a controller device and a monitor device.

7. A system for communicating with smart telemetry devices as Web Services, the system comprising:

a software application;

a smart telemetry device; and

a server, wherein the server accepts a request from the software application comprising discovering, configuring, and controlling the smart telemetry device via a first Web Service technology, forwards the request to the smart telemetry device via a second Web Service technology, receives information from the smart telemetry device in response to the request via the second Web Service technology, and returns the information to the software application via the first Web Service technology.

8. The system of claim 7, wherein the first Web Service technology comprises one or more of XML, SOAP, WSDL, UDDI, HTTP, and SMTP.

9. The system of claim 7, wherein the second Web Service technology comprises one or more of XML, SOAP, WSDL, UDDI, HTTP, and SMTP.

10. The system of claim 7, wherein the smart telemetry device comprises one or more of a controller device and a monitor device.

11. The system of claim 7, wherein the server provides Web Services accessible to the software application that provide communication and management interfaces for the smart telemetry device, an infrastructure allowing for the smart telemetry device to exchange services with the server, and core Web Services that provide functionality to both the software application and the smart telemetry device.

12. The system of claim 11, wherein the Web Services accessible to the software application that provide communication and management interfaces for the smart telemetry device comprise configuration management that allows the application to determine the current settings for the smart telemetry device and to change a specific setting on the smart telemetry device.

13. The system of claim 11, wherein the Web Services accessible to the software application that provide communication and management interfaces for the smart telemetry device comprise a directory service that enables the application to locate the smart telemetry device based on one or more of serial number, model number, location, state, communication protocol, and function of the smart telemetry device.

14. The system of claim 11, wherein the Web Services accessible to the software application that provide communication and management interfaces for the smart telemetry device comprise a messaging service that allows the application to manage the messages and alerts that the smart telemetry device can send.

15. The system of claim 11, wherein the Web Services accessible to the software application that provide communication and management interfaces for the smart telemetry device comprise a security service that allows the application to manage the access control and security settings for the smart telemetry device.

16. The system of claim 11, wherein the Web Services accessible to the software application that provide communication and management interfaces for the smart telemetry device comprise a device specific service that allows the application to access functions that are specific to the smart telemetry device.

17. The system of claim 11, wherein the infrastructure allowing for the smart telemetry device to exchange services with the server comprises a device message service that provides a mechanism for generating out-bound messages that are specific to the smart telemetry device.

18. The system of claim 11, wherein the infrastructure allowing for the smart telemetry device to exchange services with the server comprises a device message translator that translates incoming messages from the smart telemetry device into server scripts.

19. The system of claim 11, wherein the infrastructure allowing for the smart telemetry device to exchange services with the server comprises a device extension service that allows the smart telemetry device to offload functionality so that it may be executed on the server.

20. The system of claim 11, wherein the infrastructure allowing for the smart telemetry device to exchange services with the server comprises a device switchboard that is responsible for routing in and out message queues of the smart telemetry device.

21. The system of claim 11, wherein the core Web Services that provide functionality to both the software application and the smart telemetry device comprise a core configuration management service that allows the smart telemetry device to store its configuration parameters on the server.

22. The system of claim 11, wherein the core Web Services that provide functionality to both the software application and the smart telemetry device comprise a universal message service that allows the smart telemetry device to store its message on the server.

23. The system of claim 11, wherein the core Web Services that provide functionality to both the software application and the smart telemetry device comprise a dial-tone access management service that allows the smart telemetry device to communicate with the application using intermittent or shared connections.

24. The system of claim 11, wherein the core Web Services that provide functionality to both the software application and the smart telemetry device comprise a security core service that allows the smart telemetry device to communicate in a secure and non-repudiated manner.

25. The system of claim 11, wherein the core Web Services that provide functionality to both the software application and the smart telemetry device comprise a device class interface service that allows the smart telemetry device to specify the interface that the application can use to access the smart telemetry device.

26. A method used by a server to proxy communication between a software application and a smart telemetry device, the method comprising:

accepting a request from the software application comprising discovering, configuring, and controlling the smart telemetry device via a first Web Service technology;
forwarding the request to the smart telemetry device via a second Web Service technology;
receiving information from the smart telemetry device in response to the request via the second Web Service technology; and
returning the information to the software application via the first Web Service technology.

27. The method of claim 26, wherein the first Web Service technology comprises one or more of XML, SOAP, WSDL, UDDI, HTTP, and SMTP.

28. The method of claim 26, wherein the second Web Service technology comprises one or more of XML, SOAP, WSDL, UDDI, HTTP, and SMTP.

29. The system of claim 26, wherein the smart telemetry device comprises one or more of a controller device and a monitor device.

30. A method used by a server, which acts as a proxy between a smart telemetry device and an application, to communicate with the smart telemetry device, the method comprising:

receiving an message from the smart telemetry device in a Web Service technology;
determining the identity of the smart telemetry device based on one or more of address and
device class information contained in the message;
selecting a device description document that specifies how the smart telemetry device
communicates with the server from the identity of the smart telemetry device; and
using the device description document to translate the body of the message.

31. The method of claim 30, wherein the Web Service technology comprises XML.

32. A system for a smart telemetry device to communicate with an application via an XML
format, the system comprising:

a communications link that provides the transport for exchanging messages between the
smart telemetry device and the application;
an input message queue that stores incoming messages;
an output message queue that stores outgoing messages;
an XML message processor that parses the incoming message and forwards the payload of
the incoming message to a firmware function;
an XML message generator that converts a firmware-generated message to XML; and
device specific functions that are firmware functions that make up the smart telemetry
device's functionality.

33. A liquid and gas tank telemetry system, the system comprising:

a tank containing material comprising one or more of a liquid and a gas;
a monitor device that is attached to the tank to provide information about the tank;
a controller device that automatically receives or reads data from the monitor device;

a telemetry database that stores telemetry data;

a software application;

a device for communicating telemetry alerts to a user; and

a telemetry server that communicates with the controller device, retrieves and stores data in the telemetry database, provides an interface to the software application, and forwards telemetry alerts to a means for communication telemetry alerts to a user.

34. The system of claim 33, wherein the monitor device that is attached to the tank to provide information about the tank comprises one or more sensors that measure one or more of tank pressure, line pressure, tank level, tank temperature, tank leakage detection, and flow rate in and out of the tank.

35. The system of claim 33, wherein the software application comprises one or more of inventory, scheduling and routing, billing or invoice, and enterprise resource planning systems.

36. The system of claim 33, wherein the device for communication telemetry alerts to a user comprises one or more of a computer receiving email, a PDA receiving email, a cellular phone receiving email, a PDA receiving text messaging, a cellular phone receiving text messaging, a pager receiving text messaging, a cellular phone receiving voice messaging, a telephone receiving voice messaging, a PDA receiving instant messaging, a cellular phone receiving instant messaging, and a computer receiving instant messaging.

37. A method used by a server to facilitate the communication between a software application and a smart telemetry device, the method comprising:

accepting a request from the smart telemetry device to send information to the application via
a protocol native to the smart telemetry device; and
forwarding the information to the application via a Web Service technology.

38. The method of claim 37, wherein the Web Service technology comprises one or more of XML, SOAP, WSDL, UDDI, HTTP, and SMTP.

39. The system of claim 37, wherein the smart telemetry device comprises one or more of a controller device and a monitor device.

40. A method used by a server to facilitate the communication between a software application and a smart telemetry device, the method comprising:
accepting a request from the smart telemetry device to send information to the application via
a first Web Service technology; and
forwarding the information to the application via a second Web Service technology.

41. The method of claim 40, wherein the first Web Service technology comprises one or more of XML, SOAP, WSDL, UDDI, HTTP, and SMTP.

42. The method of claim 40, wherein the second Web Service technology comprises one or more of XML, SOAP, WSDL, UDDI, HTTP, and SMTP.

43. The system of claim 40, wherein the smart telemetry device comprises one or more of a controller device and a monitor device.